first and second portions of a silicon carbide layer, forming openings through the masking layer to expose the first portions of the silicon carbide layer, and implanting ions into the first portions of the silicon carbide layer.

The silicon carbide layer is preferably heated to form an oxide layer thereon having first portions on the first portions of the silicon carbide layer, and having second portions on the second portions of the silicon carbide layer. The first portions of the oxide layer have a first thickness, and the second portions of the oxide layer have a second thickness less than the first thickness.

The method preferably further includes removing the oxide layer to form isolating regions in the first portions of the silicon carbide layer. Insulation material may be deposited in the isolating regions to form isolating structures. The masking layer may be removed before heating the silicon carbide layer. The ions may comprise heavy ions or a dopant.

Another aspect of the invention is directed to a method for forming isolating trenches for an epitaxially grown diode. The method preferably comprises forming a first epitaxial layer having a first type of conductivity on a silicon carbide layer, and forming a second epitaxial layer having a second type of conductivity on the first epitaxial layer. A masking layer is formed on the second epitaxial layer, and openings are formed through the masking layer to expose first portions of the second epitaxial layer.

The method preferably further comprises removing the first portions of the second epitaxial layer to expose first

portions of the first epitaxial layer, and implanting ions into the first portions of the first epitaxial layer. The first and second epitaxial layers and the silicon carbide layer are heated to form an oxide layer having first portions on the first portions of the first epitaxial layer, and having second portions on the second epitaxial layer.

Cont. A1

The first portions of the oxide layer have a first thickness, and the second portions of the oxide layer have a second thickness less than the first thickness. The oxide layer may be removed to form isolating trenches in the first portions of the first and second epitaxial layers. Insulation material may be deposited in the isolating trenches.

Yet another aspect of the invention is directed to a method for isolating an edge of an epitaxially grown diode. After the isolating trenches have been formed as discussed above for the epitaxially grown diode, a ring mask is formed on a peripheral portion of the isolating trenches. Ions are implanted into the isolating trenches to form an implanted region in the first epitaxial layer that extends across a bottom and sidewalls of the trench adjacent the ring mask for isolating the edge of the epitaxially grown diode.

The method preferably further includes removing the ring mask, and heating the first and second epitaxial layers and the silicon carbide layer to form a second oxide layer on the trench and on the second epitaxial layer. A portion of the second oxide layer on the second epitaxial layer may be removed. --